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THESIS

THE APPLICATION OF COST-BENEFIT
ANALYSIS IN RAISING THE NONCOMPETITIVE
SMALL PURCHASE THRESHOLD

by

Robert Leo Howard III

September 1987

Thesis Advisor:

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focus on administrative order costs, shortage costs, procurement administrative lead time, and productivity of acquisition personnel.

This thesis will conclude with observations about the non-competitive threshold and make recommendations concerning a policy change.

Approved for public release; distribution is unlimited.

The Application of Cost-Benefit Analysis in
Raising the Noncompetitive Small Purchase Threshold

by

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B.S., University of Mississippi, 1977

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

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ABSTRACT

The purpose of this thesis is to determine the economic impact of a proposed acquisition policy change. As an interim measure, a class deviation to the Federal Acquisition Regulation was issued 4 June 1987. The change increases the small purchase noncompetitive threshold from \$1,000 to \$2,500 for a test period of one year. This deviation was issued after the research commenced but before this report was issued. The primary reason for this change is to reduce the administrative cost associated with obtaining competition. Consequently, the government should be prepared to make a trade-off between the administrative cost of competing and any savings realized from competition.

Using the data collected from two field activities, NAS Point Mugu and NWC China Lake, an analysis was conducted to determine the costs and benefits associated with increasing this threshold. This research will focus on administrative order costs, shortage costs, procurement administrative lead time, and productivity of acquisition personnel.

This thesis will conclude with observations about the noncompetitive threshold and make recommendations concerning a policy change.

DEDICATION

This thesis is dedicated to

LT Robert Leo Howard, Jr.
Supply Corps, United States Navy
18 Jan 1927 to 18 May 1987

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I. INTRODUCTION

A. THE ISSUE

The Defense Procurement system, a myriad of rules and regulations designed to further the interests of the government, directs a corps of dedicated, professional, individuals in managing the government acquisition process. Within the Procurement system is the Simplified Procurement Procedure which governs purchases not exceeding \$25,000. There exists a subset within the Federal Acquisition Regulations (FAR) known as the Small Purchase Process that governs purchases less than \$1,000. The terminology of Small Purchase Process and Simplified Procurement Procedures will be used interchangeably throughout this thesis. As outlined in Part 13 of the Regulation, purchases not exceeding \$1,000 do not require competitive bids to determine if the offered price is fair and reasonable. Table 1.1 outlines the requirements for each class of small purchase procurement.

Basically, the issue is, should this threshold be increased to \$2,500? In the opinion of personnel assigned to the field contracting activities, the current threshold of \$1,000 appears to be thwarting efficiency, in that seeking competition delays the procurement process. Any savings achieved from obtaining competition does not offset

the cost incurred while waiting for the material or service being procured. A more general issue is, how high should this threshold be?

While conducting research for this thesis, the Assistant Secretary of Defense (P&L) issued a class deviation to the FAR temporarily increasing the small purchase threshold from \$1,000 to \$2,500. [Ref. 1]

TABLE 1.1
PROCUREMENT LEVEL REQUIREMENTS

<u>PURCHASE VALUE</u>	<u>REQUIREMENTS</u>
\$1,000 or less	Government contracting officer determines if the price is fair and reasonable. Purchases must be equally distributed among local vendors. (So long as prices are fair and reasonable.)
Greater than \$1,000 but less than \$25,000	Buyers must solicit a reasonable number of quotations (three) to determine if the price is fair and reasonable. Otherwise a sole-source statement is necessary. Quotations may be oral except for construction contracts greater than \$2,000. These quotations must be in writing.
Greater than \$25,000	Small purchase procedures no longer apply to the acquisition of open market items. These requirements must be procured through formal contracting procedures which include a thirty day synopsis in the Commerce Business Daily, request for quotations, and written proposals among other requirements.

B. BACKGROUND

The procurement environment we know today was created forty years ago with the enactment of the Armed Service Procurement Act of 1947. This Act established the initial criteria to guide government procurement. Two years later, in 1949, the Federal Property and Administrative Service Act established regulations governing soliciting bids and making awards for government contracts. It stated that all procurements greater than \$1,000 required formal advertising unless they met one of seventeen specific exceptions. This original \$1,000 has been increased over forty years to its present level of \$25,000.

The Armed Services Procurement Regulations created the small purchase and other simplified purchase procedures. These procedures include the imprest fund, blanket purchase agreements, delivery orders, and purchase orders. The reason for these procedures is to reduce the administrative costs associated with effecting a purchase and to provide an opportunity for small businesses to receive a proportion of government contracts. Consequently, the government should be prepared to make a compromise between the administrative costs of competing and any savings realized from competition. This is not to say the government should pay a high, exorbitant price to a vendor that is not qualified to perform the required task. Rather, it must be recognized that a trade-off between seeking competition and awarding to the first vendor who responds to the solicitation will

produce the lowest, net acquisition cost. Additionally, prices less than the competitive threshold should be fair and reasonable based on fair market prices in the competitive market place.

When the simplified small purchase procedures were created by the Armed Services Procurement Regulations, a threshold of \$250 was established as the minimum price for obtaining competition. For a purchase exceeding \$250 three bids were required. That is, if a procurement was to be below this amount, a government contracting officer did not have to seek competition to demonstrate price reasonableness. This threshold represented twenty-five percent of the small purchase threshold of \$1,000.

In August, 1958, Public Law 85-800 increased the small purchase threshold to \$2,500. However, the noncompetitive limitation remained at \$250. This represented only ten percent of the small purchase threshold. In July, 1974, under Public Law 93-356 the small purchase threshold was increased to \$10,000 and the competition requirement increased to \$500. However, this represents only five percent of the small purchase threshold. In November, 1982, under Public Law 97-86 these thresholds were increased to \$25,000 and \$1,000 respectively. The current small purchase threshold is \$25,000 and there exists a temporary noncompetitive threshold of \$2,500 in effect for one year. The \$1,000 represents only four percent of the small purchase threshold. As the small purchase threshold was

increased through time, the threshold for competition has not kept pace. It has decreased from twenty-five percent of the small purchase threshold to ten percent, five percent, and to four percent. The temporary threshold represents ten percent of the current small purchase threshold. Figure 1.1 depicts the two relationships in 1947 and 1958, the first year they were established and the first time a threshold was increased.

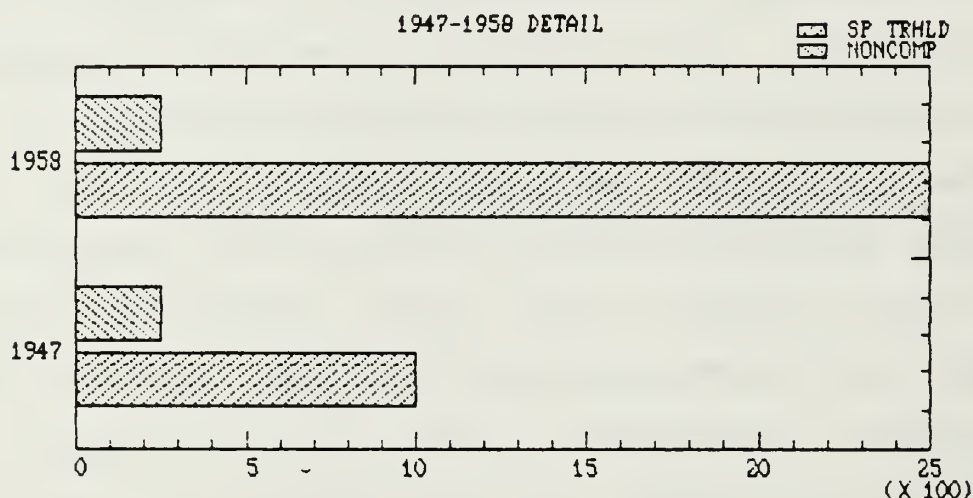


Figure 1.1 Small Purchase Threshold Vs.
Noncompetitive Threshold

Figure 1.2 depicts the two thresholds from when they were first established until the latest revision in 1982.

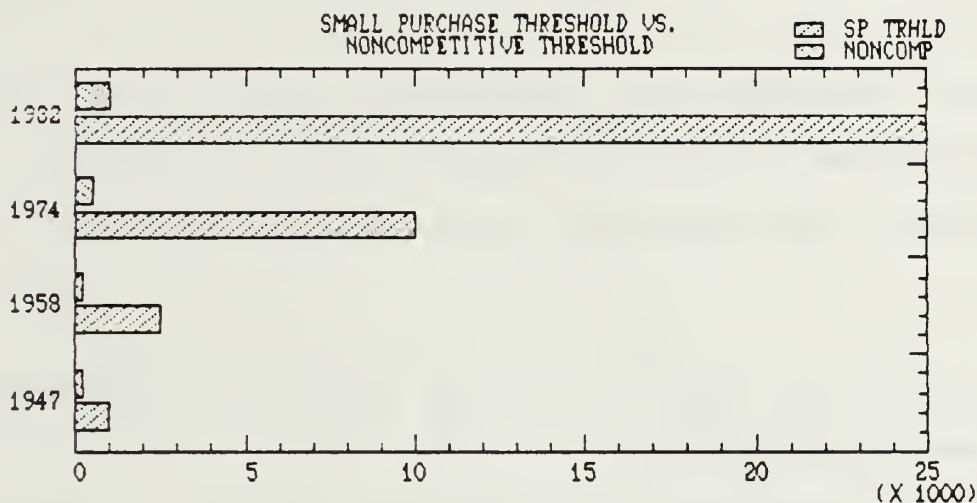


Figure 1.2 Small Purchase Threshold Vs. Noncopetitive Threshold

In June 1986, the Contracting Branch of the Naval Weapons Center China Lake Supply Department submitted a Model Installations Program Initiative (MIPI) to increase the small purchase competition requirement from \$1,000 to \$2,500. In July and September, both Commander, Space and Naval Warfare Systems Command and Commander, Naval Supply Systems Command indicated their favorable support for the concept to Assistant Secretary of the Navy (Shipbuilding and Logistics, (S&L)). [Ref. 2; Ref. 3] In fact, the Naval Supply Systems Command Strategic Plan of June 1985 proposes similar policies in an attempt to enhance the procurement

and customer service relationships. One of the Strategic Plan objectives is to develop a plan of action and milestones (POA&M) which would review short and long term solutions to reduce acquisition lead times and procurement backlogs. [Ref. 4]

In November 1986, Assistant Secretary of Defense (Acquisition and Logistics (A&L)) issued a memorandum to the Military Secretaries and Director Defense Logistics Agency stating:

. . . for those installations designated as model installations, the Services are requested to test (for calendar year 1987) raising the threshold in FAR 13.106 from \$1,000 to \$2,500

However, China Lake was not designated to be a participant in this experiment. [Ref. 5] Aside from this, also in November, the Naval Supply Systems Command sponsored a workshop designed to gather ideas from various government and industrial procurement experts. Labeled the Defense Contract Simplification Workshop, it endorsed the same concept of increasing the threshold to \$2,500. [Ref. 6] This recommendation and fifty-three others were forwarded to the Deputy Assistant Secretary of Defense for Procurement on 15 January 1987.

On 12 January 1987, the Assistant Secretary of the Navy (S&L) denied China Lake's request stating ". . . the request would not lead to improved pricing through competition" [Ref. 7] One interpretation of his statement might be he was looking at a decrease in

competition vice looking at the potential for an increase in productivity. The intent of the initiative was to eliminate time and cost consuming restrictions, namely obtaining three competitive quotations and delaying the procurement process in doing so.

On June 4, 1987, the Assistant Secretary of Defense (P&L) issued a class deviation to the FAR. It increased the small purchase noncompetitive threshold from \$1,000 to \$2,500 for a test period of one year.

C. OBJECTIVE

The purpose of this thesis is to experimentally evaluate the economic impact of increasing the small purchase noncompetitive threshold from \$1,000 to \$2,500. The costs and benefits associated with increasing this threshold will be appraised.

D. RESEARCH QUESTIONS

Primary research question:

What are the economic effects of raising the noncompetitive small purchase threshold from \$1,000 to \$2,500?

Secondary research questions:

What are the incremental costs to the government resulting from increasing the noncompetitive small purchase threshold?

What are the material benefits to the government resulting from increasing the noncompetitive threshold?

What effect would raising the threshold have on Procurement Administrative Lead Time (PALT)?

E. RESEARCH METHODOLOGY

Research data was collected through telephone and personal interviews, literature search, and a review of purchase files at Naval Weapons Center, China Lake and Naval Air Station, Point Mugu. Interviews were conducted with personnel at Naval Supply Systems Command, Naval Postgraduate School, Naval Supply Center, San Diego, Naval Regional Contracting Center, Long Beach, Naval Submarine Base, Kings Bay, and other field level contracting personnel.

The literature review included Congressional legislation, the Federal Acquisition Regulation (FAR), Naval Supply Acquisition Regulation Supplement (SUPAR) (NAVSUP Publication 560), General Accounting Office reports, newspaper articles, Defense Logistics Studies Information Exchange reports, Naval Postgraduate School Masters Theses, Naval Weapons Center, China Lake MIPI with supporting documentation, and China Lake and Naval Air Station, Point Mugu Purchasing Desk Guides.

F. ORGANIZATION OF THE STUDY

This research is organized to give the reader an overview of the Defense small purchase environment. Chapter II provides a synopsis of what procurement personnel must do in order to award a small purchase contract. Chapter III provides the answers to the interview questions asked at NWC China Lake and NAS Point Mugu. Chapter IV provides an

analysis of the data obtained from NWC China Lake and NAS Point Mugu. Chapter V identifies the author's conclusions and recommendations about the noncompetitive threshold and what improvements might be realized.

G. SCOPE, LIMITATIONS AND ASSUMPTIONS

The thesis will present, analyze, and evaluate small purchase procedures issued under the noncompetitive threshold as outlined in the Federal Acquisition Regulation, Chapter 13. In particular the impact of raising the limit to \$2,500 will be analyzed and conclusions and recommendations drawn on this analysis will be made.

The research of purchase files was limited to two activities, Naval Weapons Center, China Lake and Naval Air Station, Point Mugu. China Lake was selected because of the role it played in submitting the MIPI and Point Mugu was selected because of its similarity in its mission with China Lake; namely, Research & Development and Test & Evaluation. It is assumed the reader is familiar with standard Department of Defense acquisition concepts and terminology as well as the Federal Acquisition Regulation and its associated idiosyncrasies.

II. TRANSACTION PROCEDURES

Some of the small purchase procedures as they exist today are not as simplified as one is led to believe. If the anticipated unit price or purchase price is greater than \$1,000, the simplicity begins to disappear rather quickly as the buyer must face numerous regulations and constraints. What follows is a brief description of what a buyer must do in these cases prior to awarding a contract.

A typical procurement will commence when the buyer receives a requisition. The buyer will review the requisition to ensure there are sufficient salient characteristics so that he can make the purchase. At the same time the buyer must also consider the type of procurement instrument to utilize. Options include the imprest fund, a blanket purchase agreement, a delivery order, or a purchase order. A brief description of each follows.

The imprest fund is the simplest of all the procedures. Essentially it is a petty cash fund with a normal purchase limitation of \$500. However, buyers are not usually involved with the imprest fund because it is controlled by the imprest fund cashier who is normally not a buyer. Also, due to the low dollar threshold, the imprest fund falls outside the scope of this thesis.

This thesis will address the blanket purchase agreement, the delivery order, and purchase order. The blanket purchase agreement resembles the standard consumer charge account. It is based on an agreement written with local vendors who are utilized on a repetitive basis. The contracting organization places oral calls against this agreement. The vendor delivers the material and bills the government on a monthly basis. This is a fairly simple procedure and preempts the need for initiating written purchase orders for every procurement action. As simple as the procedures are, the blanket purchase agreement does not release the buyer from the requirement to seek competition for any procurement action greater than \$1,000.

The delivery order is an order placed against a contract awarded by a government agency like the General Services Administration (GSA) or it is an order placed with another governmental source like the Federal Prison Industries, National Industries for the Blind, or National Industries for the Severely Handicapped. Listings known as the Federal Supply Schedules are promulgated by the General Services Administration. These list those organizations that have been awarded contracts for selective items. Some of these contracts are mandatory schedules meaning the buyer must place an order for the desired item with one of the listed contractors who is able to meet the schedule requirements. This reduces some of the buyers flexibility. However, if the buyer is able to find a lower price in the open market,

the schedule may be dispensed with. Similarly if an urgent requirement is placed, the schedules may also be waived in order to fill the requirement. The contracting officer may waive the schedule, but in doing so, he must document reasons why.

Lastly is the purchase order of which the major research for this paper was centered around. The Naval Supply Systems Command Publication 560 in paragraph 13.501 defines a purchase order:

A purchase order is an offer by the government to buy certain supplies and services in accordance with specified terms and conditions contained in the order. A purchase order is awarded as a result of a quotation

When issuing a purchase order, a buyer essentially starts from the beginning. That is, he must seek out potential vendors based on the commodity required and review the vendor's prices. This procedure is very time consuming. The buyer must review such things as the local classified telephone listing, Thomas Register, industrial supply catalogs, and industrial listings. Additionally, there is a Procurement and Planning directory and various General Services Administration catalogs and schedules to review. If a purchasing agent has expertise in the commodity sought, this search time is reduced.

If there are numerous individual items requested, no local vendors available, or very detailed specifications or drawings, then a written request for quotation (RFQ) should be utilized. If a request for quotation is generated it is

mailed to at least three vendors. The individual items are listed with their descriptions. Vendors should be given sufficient time to respond, taking into consideration the customer's required delivery date. The vendor should be given at least thirty calendar days to process the RFQ and return it to the buying office.

An oral solicitation for the most part is quicker than the written requests for vendor quotations as vendors often respond to the buyers solicitation almost immediately. On some occasions the vendor must take time to research the material and reply at a later date. Some buys will require ten to twelve telephone calls before three responsible bids are received. [Ref. 8] On other occasions it will take a few days for a vendor to respond and there is the chance a buyer and vendor will miss each other, further delaying the process.

Once received, all quotes must be recorded on a bid abstract sheet or small purchase worksheet where the quotes are analyzed for price reasonableness. Obviously when more items are requested, more time is required to analyze the quotes. Another consideration concerning multi-item quotes is when one vendor might submit a lower quote than another for only a few items. If this difference is significant, the evaluation is further complicated as the buyer must undergo a more extensive review of the quotes. It is the responsibility of the buyer to ensure that every purchase is made at a fair and reasonable price and that the government

receives what it pays for in terms of quality and delivery. [Ref. 9] Once a vendor is selected the buyer must document the corresponding purchase files as to the reasons for selection and prepare the purchase instrument for that action.

Listed below are some common pitfalls that buyers must be aware of:

- a. The buyer must ensure the vendor is a regular dealer and technically competent to provide the service or material.
- b. The buyer must be alert to possible collusion between vendors and ensure vendors are not affiliated with nor subsidiaries of each other.
- c. The buyer must verify that one manufacturer is not supplying two different dealers since they will base their price on his price and insert their markup.
- d. The buyer must ensure the requested item is not a prohibited item nor requires special approval from activities outside the command.

There are specific socio-economic issues that must be adhered to as well. All small purchase requirements under \$25,000 must be awarded to a small business organization unless it can be documented that to do so is not in the best interest of the government. The Davis-Bacon Act, Service Contract Act, and Buy American Act are other statutes that also must be considered depending on the commodity or service being procured and the value of the action. Additionally, there are items to be purchased from specific vendors and a list of material exempt from the Buy American

Act. Table 2.1 is a listing of some of the more prominent thresholds and the various restrictions that must be considered by purchasing personnel.

TABLE 2.1
SMALL PURCHASE PROCUREMENT THRESHOLDS

<u>DOLLAR VALUE</u>	<u>LIMITATION</u>
500	maximum amount of an imprest fund purchase
1,000	previous threshold requiring either competition or a sole-source statement if price is greater than \$1,000. Purchases less than \$1,000 should be equally distributed among local vendors.
2,000	Davis-Bacon Act (1931) applies. Purchase orders in excess of \$2,000 for construction require special clauses relating to labor and minimum wages to construction workers.
2,500	Service Contract Act (1965) applies. Services in excess of \$2,500 require special clauses with respect to minimum wages, safety and health standards.
***	Assistant Secretary of Defense (P&L) issued a class deviation to the FAR establishing \$2,500 as the limit dtd 4 Jun 87.
5,000	All purchases greater than \$5,000 must be reviewed by the Small & Disadvantaged Business Utilization Specialist (SADBUS) prior to solicitation if the purchase is not going to be made to a small business.
10,000	Walsh-Healey Public Contracts Act (1936) contractor selling supplies must be a regular dealer of the supplies and must pay minimum wages.
25,000	Limitation of small purchase threshold. Any procurement greater than \$25,000 must utilize formal contracting procedures.

The goal behind increasing the threshold and reducing the competition requirement is to eliminate the resource expenditures and forgone opportunity costs associated with these time consuming steps in the transaction process. This in turn will provide a quicker response to the customers' requests and there will be a flow-down of other benefits as well; i.e. quicker delivery and shorter resource down time. (Resource down time considers the traditional equipment down time but also allows for the personnel not being 100% effectively utilized due to this inoperative equipment.)

III. PRESENTATION OF DATA

On 15 and 18 June 1987, interviews were conducted with personnel assigned to the Small Purchase Branch of the NWC China Lake and NAS Point Mugu Purchasing divisions. The basis for the interviews were to determine the present workload and how it was influenced by the noncompetitive threshold of \$1,000 which was still in effect. Would raising the threshold enhance the small purchase function or would it be detrimental to the operation? Additionally, completed purchase orders were reviewed for the purpose of determining any delay in a procurement action due to the requirement of soliciting three competitive bids. The results of a questionnaire presented to both commands are presented below.

1. How many contractual actions issued are less than \$1,000?

For the period Jan thru Mar 1987, NWC reported 3969 such actions. NAS reported 1560 for the period 1 Oct 86 - 31 May 87.

2. How many contractual actions issued are greater than \$1,000 but less than \$2,500?

NWC reported 609 transactions for Jan - Mar 87 and NAS reported 568 for the period 1 Oct 86 - 3 Jun 87.

3. What percent of contractual actions which were less than \$1,000 were competed? Would you expect the same percent to be competed if the threshold is raised to \$2,500?

NWC responded that twelve percent were competed and NAS reported ten percent. Both commands stated they would expect the same percentage to be competed if the threshold were raised.

4. What effect would raising the limit have on the buying offices resources? Will it free resources?

Both commands replied they anticipated more purchases would be made. To what extent resources have been freed has not yet been determined.

5. How many personnel are dedicated to small purchase? This answer should include buyers, supporting typists, and other administrative personnel.

NWC has sixty-three personnel assigned to the small purchase function and NAS has twenty-seven personnel assigned.

6. What are the paygrades of those personnel involved with small purchasing? What is their longevity?

The average paygrade for both commands is a GS-5 with three years of service. Both activities have a GS-11 supervisor assigned.

7. How much overtime is dedicated to purchases between \$1,000 and \$2,500?

Neither command has their overtime segregated this way and therefore could not respond to this question.

8. What is your small purchase procurement administrative lead time?

Due to the way NWC is structured, they do not track and therefore cannot report PALT. NAS did not track PALT. However, it was estimated to be two weeks.

9. What effect would raising the limit have on PALT? Would it increase/decrease? By how much?

Both commands indicated it would decrease but could not determine by how much.

10. How many vendors are on your small purchase vendors list? Would the number of vendors increase or decrease?

NWC reported 17,150 vendors and NAS reported 15,000. Neither command could state if their lists would increase or decrease.

11. What controls are in effect to ensure rotation of vendors? If the threshold is increased, would these controls be adequate as they currently exist?

Presently at NWC there are not any controls. They are waiting for an ADP system (not APADE) to be installed that will assist the buyers with this requirement. At NAS each buyer has his or her own tickler system they use to rotate the procurements. It is the opinion of the researcher that presently neither command utilizes a system that can ensure procurements are adequately rotated among vendors.

12. What savings might accrue by raising the noncompetitive threshold (reduction in personnel; reduction in administrative support; reduction in storage costs; reduction of backlog)?

NWC replied a reduction in backlog and administrative support would occur as a result of an increased threshold. NAS replied if they experienced any workload decreases they would direct the gained manhours toward the administrative functions.

13. If there is a backlog due to the competitive threshold, does it place any program in jeopardy? (That is, will any program be cancelled due to the lack of services or material that cannot be received in timely manner?)

NWC replied a cancellation might not occur, but there have been detrimental impacts. NAS also replied cancellation is not probable. NAS further stated the priority could be increased or a sole source procurement utilized if required.

14. How might the efficiency or effectiveness of the buying process be improved by increasing the limit from \$1,000 to \$2,500?

Both commands replied more buys would be made in less time.

15. What training have your small purchase buyers received?

Both commands stated their buyers have attended the DoD Small Purchase Course, various DoD training courses, OJT, in-house training, and training on selected issues.

16. Are the buyers responsible/mature/experienced enough to determine a fair and reasonable price at an increased threshold?

Both commands stated their buyers were mature/experienced enough to function responsibly at an increased threshold.

17. Will you require a change in personnel - more training, higher paygrades?

Both commands stated the less complex buys require less experience. Therefore, a less senior/less experienced buyer could perform these noncompetitive procurements. Some additional training in the area of price reasonableness might be required.

IV. ANALYSIS

A. ANALYSIS

A sample of purchase orders was randomly selected from manual logbooks and a computerized listing maintained by the procurement clerks interviewed. The universe was defined to be those purchase orders whose acquisition value was between \$1,000 and \$2,500 and only one item was purchased. The researcher reviewed these purchase orders to determine if three competitive quotations were obtained; to determine the monetary difference between quotations; and to determine how long the procurement actions were delayed while the buyers waited to receive these quotations. The sample was constructed so as to disregard those awards issued under mandatory GSA schedules, blanket purchase agreements, and sole-source requirements as they tend to limit competition. Each purchase order was reviewed for the following data:

1. date the requisition was received
2. date competition was solicited
3. dates bids were received
4. price quoted by the quotation
5. price of the purchase order
6. date the award was made

The following assumptions were made based on the data reviewed:

- The money saved as a result of competition was computed accordingly:
 - a) an average of the bids received was calculated
 - b) the value of the contract awarded was subtracted from the average of the bids received

- c) the difference of (a-b) was deemed to be the money saved as a result of obtaining competition

This process was selected because it incorporates all quotations received. If no competition were required for purchase orders less than \$2,500, the buyer would have an equal opportunity to select any one of the bids. Any quotation received greater than \$2,500 was not considered because it exceeded the dollar limitation of the universe and the buyer would have to seek competition even under the changed condition.

- The number of days that elapsed between solicitation of quotations and vendor response is the delay due to seeking competition. The measured time span began when the first solicitation was made as indicated by the date of the request for quotation (RFQ) and ended when the last quotation was received as indicated by a date-time stamp. This does not take into consideration the time required to draft/prepare the RFQ prior to transmitting it. Although another source of delay, the RFQ preparation time was not included in the analysis because the researcher was attempting to isolate only the time delay from when the RFQ was issued until the vendors responded. Generally, if an RFQ is used, it is a good indication of a need for competition. This should forewarn the customer to anticipate some delay in receiving the material.
- For oral solicitations, the period of time is measured from when the buyer made his first telephone call and it stopped the date the last telephone response was received. In some cases this was only one day.

The following example is provided to demonstrate how the data was evaluated:

Vendor A quotes \$1,575 on 15 September
Vendor B quotes \$1,489 on 19 September
Vendor C quotes \$1,354 on 24 September

The average of the three quotations is \$1,472.67.

The contract is awarded to vendor C on 26 September.

The computed savings is $\$1,473 - 1,354 = \119

The corresponding time delay is nine days; $24 - 15$.

Tables 4.1 and 4.2 depict the amount of money saved and the number of days the contract award was delayed as a result of obtaining competition.

TABLE 4.1
NAS POINT MUGU

Money saved by obtaining three quotations		Amount of days delay due to completion	
	\$61.25		5
	\$196.73		2
	\$202.40		21
	\$361.04		29
	\$347.78		37
	\$298.80		2
	*		25
	*		9
	*		31
	*		19
TOTAL	\$1,468.00	TOTAL DAYS	180

Based on ten purchases \$146.80 were saved per transaction.

Each transaction was delayed eighteen days.

* Even though there were no savings realized, these actions are included because the purchase award was delayed due to the requirement to seek competition.

TABLE 4.2
NWC CHINA LAKE

Money saved by obtaining three quotations	Amount of days delay due to competition
\$145.49	10
\$ 30.83	1
\$ 69.50	8
\$ 86.50	0
\$164.00	4
\$ 96.75	8
\$305.33	28
\$ 41.33	8
\$ 67.50	16
\$322.00	18
*	7
*	6
*	7
TOTAL \$1,329.23	TOTAL DAYS 121

Based on thirteen purchases \$102.25 were saved per transaction.

Each transaction was delayed 9.3 days.

* Even though there were no savings realized, these actions are included because the award was delayed due to the requirement to seek competition.

To summarize, the average savings and delay of both commands are presented:

SAVINGS

\$122

DELAY

13 days

In achieving these savings, certain costs must be recognized. Some of these costs will be qualitative and others will be quantitative.

1. Qualitative

The qualitative costs include the day to day slippage a project would incur because of competition. This is a result of not having the required item and not being able to continue production or experimentation. This delay impacts not only the individual activities but also outside

commands. Both NAS Point Mugu and NWC China Lake are research and development centers and play major roles in weapons development and fleet support. Therefore, any program slippage will have a detrimental impact on the operating forces. The Pacific Missile Test Facility is located at NAS Point Mugu and has a daily operating cost of \$500,000 per day [Ref. 10]. One of its major assets is the open water range which is reserved many months in advance by DOD and DOD contractors. Likewise, China Lake is the home of the two largest, live firing, inland ranges in the free world. Given the national importance of these commands, their operating capability is extremely critical. Neither field activity can afford any significant downtime as this can lead to losing a project or suffering a setback.

Another qualitative area deserving consideration is the stress procurement personnel encounter due to frustration in dealing with vendors, administrative and socio-economic requirements, and customer apprehension.

Operational availability is a third area that cannot be distinctly evaluated. It will be enhanced by reducing average customer wait time (ACWT). This is true not only for these two R&D centers, but it also applies to the general operating forces as well. An increase in the noncompetitive threshold will reduce average customer wait time and moreover enhance the combat effectiveness of these units. This is especially true when units deploy without material and this material is forwarded to the next port-of-

call. There is an additional transportation expense incurred as well as the risk of the unit experiencing degraded mission capability.

2. Quantitative

DoD Instruction 4140.39 provides guidance in quantifying the costs to be considered when determining a procurement action cost. Primarily developed for the Inventory Control Points, it provides a sound basis for which to collect various data on administrative order costs, holding costs, and shortage costs. The goal of any inventory system is to minimize these three primary costs while at the same time maximize the availability of the demanded items.

Of the three costs, the holding costs will not be examined in as great as detail as the administrative order cost and the shortage cost. The holding cost is primarily expressed as a monetary figure per period of time comprised of the average inventory value and a hold cost rate. This rate is expressed as a percentage consisting of factors such as the time value of money invested in the inventory, holding costs, obsolescence costs, and pilferage costs. The Navy utilizes two rates to express the holding costs; twenty-three percent for consumables and twenty-one percent for repairables. [Ref. 11]

The purchase actions reviewed by the researcher were single unit, one time, direct turnover procurements. That is, the items were immediately delivered to the

requisitioner and not placed into a stock system. Therefore, holding costs for these particular items are negligible.

In this section the researcher is going to derive estimates of administrative order costs and shortage costs. Within the simplified purchasing system, the included costs should be those associated with the following work breakdown structures.

- A. Solicitation effort
 - purchase request review
 - determine the method of procurement
 - obtaining source list
 - drafting and typing solicitation
 - accomplishing solicitation
- B. Evaluation and Award effort
 - price/cost analysis
 - selection of contractor
 - draft and type contract
 - purchase office review
 - distribution of contract
- C. Indirect Labor/Support costs not included in A & B above
 - communication costs
 - internal reproduction equipment rental
 - cost of printing contracts and solicitations
 - cost of materials and supplies
 - cost of mail
 - automated data services
 - support personnel
 - facilities cost

In fiscal year 1985, following DODI 4140.39 guidelines, NWC China Lake determined the total cost attributed to one purchase order to be \$126.71 [Ref. 12]. Of this, \$46.23 is directly attributed to the procurement transaction cost.

This cost includes:

ADP processing	\$18.12
Telephone charges	\$ 3.05
Utilities/maintenance	\$ 6.05
Purchase div. labor	\$18.56

If the competition threshold is increased there will be an expected decrease in the costs associated with the work breakdown structures previously mentioned because fewer vendors will be solicited to obtain a quotation. Utilizing the data obtained, if the noncompetitive threshold is increased, a reduction in the following areas has been determined: administrative order cost; and shortage cost. There will be an increase in productivity which could provide a further savings in procurement transaction costs due to a reduction in manpower costs.

B. ADMINISTRATIVE ORDER COST

The administrative order cost is the cost attributed to purchasing the material. It includes those costs to generate the requirement, process the procurement, receive and store the material, and all other procurement/receipt related costs. Any changes associated with personnel productivity and payroll will be addressed within this expense element. The cost estimate provided by NWC China Lake places the administrative order cost at \$128 per procurement transaction, \$46 of which is solely for processing the purchase. By increasing the noncompetitive threshold to \$2,500 this cost will decrease by approximately 30% to \$32

[Ref. 8]. This is based on an immediate reduction in associated ADP costs and telephone charges incurred while soliciting quotations. Additional savings will be realized due to the reduction of effort by the initiator and other staff functions such as the sole-source determination board. These two functions require about 2.5 man-hours and incur a cost of \$53. In fiscal year 1985, NWC reported forty percent of the 51,000 requisitions received were sole-source. If these two areas also experience a forty percent in effort per transaction, then these costs will decrease by \$21 to \$32. By raising the threshold to \$2,500, there will be no need for a sole-source determination for those requisitions in the category \$1,000 - \$2,500. Likewise, the cost of mail, supplies, and material will be decreased. The administrative order cost has the potential to decrease from \$127 to \$92.

1. Productivity

By increasing the threshold there will be a thirty percent increase in productivity by personnel in the procurement branch [Ref. 8; Ref. 13]. This could lead to personnel changes either as interdivisional assignments or a reduction in the work force. Both commands indicated they would assign personnel to other functions such as training,

policy review, and customer service and vendor liaison. An analysis of NWC China Lake is provided;

NWC reported 609 transactions in the category \$1,000 - \$2,500 for the period 1 January 1987 thru 31 March 1987. Projecting this forward for the entire fiscal year, there will be 2436 procurement transactions. There are sixty personnel assigned to the small purchase branch of the China Lake contracting division. Given the following:

29,042 total transactions	260 man days per year
2436 transactions (\$1,000 - \$2,500)	1750 manhours per year
60 personnel	6.7 manhours per day*

Based on a fiscal year 1986 total workload of 29,042 small purchase transactions, the average production rate per buyer is 484 awards per year or 1.86 awards per day. In the \$1,000 - \$2,500 category, the production rate is .16 awards per day based on 2436 awards. The \$1,000 - \$2,500 purchases account for ten percent of the buyer's time. If the time dedicated to obtain competition for these purchases is reduced by one-third and they represent ten percent of the buyer's time, the net benefit is a three percent reduction of personnel. These two people could be reassigned elsewhere in the division or dismissed.

* 6.7 man-hours per day is recognized by manpower personnel as the average productivity of an average worker on a given day. However, payroll costs are computed based on an eight hour day.

2. Payroll

Due to the increase in productivity of the procurement personnel there is the potential to reduce the workforce. The payroll savings calculated below are based on utilizing the mean for the data obtained from both commands. A detailed computation is provided in Appendix A.

- the typical buyer at both commands was identified as a GS-5, step 3 with a 1987 average hourly wage rate of \$14.71. By reducing its staff by 1.5 people, each command could realize an annual payroll savings of \$45,895.

- one of a buyer's functions is to report the status of a customer's requisition. Assuming a ten percent decrease in this activity, the yearly payroll savings will be \$1,275.
- division supply clerks are tasked to directly interface with the supply department to coordinate such things as requisition status requests, technical information, specifications and other related tasks. Assuming a ten percent reduction of these functions, the annual payroll savings will be \$24,478.
- department supervisors interviewed indicated thirty percent of their time was dedicated to supply related functions. This includes writing statement of work, reviewing specifications, and coordinating delivery schedules with program schedules. Reducing their efforts by ten percent will yield a yearly payroll savings of \$35,227.

C. SHORTAGE COSTS

The shortage cost, λ , is the cost associated with not having the item when demanded. An actual cost is very difficult to determine, so DODI 4140.39 permits an implied cost to be utilized when determining inventory requirements. If actual costs are available they may be used. At the Inventory Control Points the Navy has assigned values to the individual cogs for the specific items the ICP manages. These shortage costs range from \$50 to \$6,000 and are utilized when computing shortage cost parameters.

In this thesis, shortage costs are defined as resource downtime. That is, the time an asset, personnel or equipment, are not being fully utilized while awaiting for a repair part or service. In the case of equipment, the cost is the opportunity cost of the money invested in the asset that is not being effectively utilized. Additionally, there

is a loss associated with personnel. When the end user is waiting for a part, he will not be 100% effective on that particular project. This is not to say personnel are not being productive, but there will be lost time on the current task.

1. Procurement Administrative Lead Time

The shortage cost is attributed and directly proportional to procurement administrative lead time. Procurement administrative lead time (PALT) is the time necessary to process the procurement action; measured in calendar days from the date of receipt of a requisition by the procurement activity to the day on which the award is made [Ref. 14]. If the noncompetitive threshold is increased, the time dedicated to obtaining competition will decrease from approximately nine days at NWC China Lake, or eighteen days at NAS Point Mugu, to three days at both commands. This will significantly reduce the shortage costs outlined in the previous section.

Delay due to seeking competition was calculated to be 9.3 days and a corresponding monetary savings of \$102.25 at NWC China Lake. In 1985 the mean NWC hourly rate for personnel was \$14.96. Projecting this forward using the Department of Navy's escalation rates to 1987, the revised rate is \$15.87 [Ref. 15]. Based on an eight hour work day the mean daily wage rate is \$126.96. Assuming only one worker affected, when extended over the 9.3 days delay period, there exists the potential for lost wages for the

project of \$1180.73. The researcher recognizes for some spare part requirements there will not be any impact on productivity. However, in other situations the part may be time-critical to the mission and severely impact the productivity of more than one project engineer. In most cases, the delay caused by the requirement to seek competition will result, at a minimum, in a suboptimization of personnel.

Another interpretation of the shortage cost is by a division supervisor. As managers of resource allocations, they must compensate for any decrease in productivity. Options include shifting resources or paying expediting fees. Supervisors interviewed indicated they would increase the award value by up to twenty percent depending on the circumstances surrounding the project, in order to receive the part ten days sooner. This in itself will offset any savings generated at the \$1,000 noncompetitive threshold.

D. SUMMARY OF ANALYSIS

The information below was generated by the data obtained from NWC and NAS. The cumulative mean for;

Days Delay - 13 days
Money saved by competition - \$122 per order
Annual purchase orders - 1786

The interaction on administrative order cost and associated payroll costs is presented below:

Money saved by competition ($\$122 * 1786$) = \$217,892

COST CAUSED BY COMPETITION

ADMINISTRATIVE COSTS

Admin order cost	62,510
Payroll	
Buyers released	45,895
Buyers reduced workload	1,275
Division supervisors	35,227
Division supply coordinators	24,478

SHORTAGE COSTS

technicians	\$2,947,757
Total cost caused by competition	\$3,117,142
Less money saved by competition	217,892
CUMULATIVE COST OF COMPETITION	\$2,899,250

(See Appendix A for a detailed computation)

The 2.8 million dollars indicated above approaches an upper bound representing the potential cost of obtaining competition at the \$1,000 noncompetitive small purchase threshold. The researcher recognizes that for every unfilled purchase order there may not be a lack of productivity among the technicians. However, an unfilled purchase order for services and repair parts will result in a suboptimization of command personnel. In practice a manager will redirect the technician's efforts to another project. If a technician loses as little as 1.6% of his

productive time per purchase order awaiting parts, this will offset any savings realized from obtaining competition at the \$1,000 threshold.

V. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to analyze the economic impacts resulting from increasing the small purchase noncompetitive threshold from \$1,000 to \$2,500. The principle conclusions and recommendations of this study are presented below.

A. CONCLUSIONS

1. An increase in the noncompetitive threshold from \$1,000 to \$2,500 will reduce the administrative ordering costs by thirty percent. This is a result of a reduction in the costs associated with obtaining competition in order to justify price reasonableness. The savings are realized through reduced solicitation costs, decreased requirements in cost and price analysis, and a reduction of indirect labor and other support costs.
2. An increase in the noncompetitive threshold will improve the productivity of government procurement personnel. More procurement actions will be awarded during the same allotted manhours. The opportunity to consolidate requirements under one purchase order will also enhance the productivity of the procurement

branch. Procurement managers may optimize the use of their personnel by assigning them to other tasks such as customer service and vendor liaison.

B. RECOMMENDATIONS

1. Permanently increase the noncompetitive threshold to \$2,500 as opposed to a one year test platform. The low dollar concept of small purchasing places an emphasis on productivity since it is quicker and less complicated than formal contracting procedures. As a result many small purchase transactions are completed. In fiscal year 1986, ninety percent of all Navy procurement transactions were less than \$25,000. [Ref. 16]. Furthermore, greater than ninety-eight percent of all DOD purchasing transactions were less than \$25,000 [Ref. 17]. Since procedures in small purchasing are simplified, these purchases can be completed by less experienced personnel. This will enable senior personnel to be best utilized in other functional areas such as training, policy review, customer service, and vendor liaison. The researcher recommends increasing the noncompetitive threshold to \$2,500 on a permanent basis.
2. The small purchase noncompetitive threshold should be a rate that can be adjusted annually to reflect current economic indices. One requirement could place the rate at a fixed percentage of the small

purchase dollar threshold, ie; ten percent, fifteen percent, etc. The researcher recommends the Congress enact legislation establishing the noncompetitive threshold as a fixed ratio of the small purchase threshold.

3. The researcher recommends the GAO initiate a study for the sole purpose of investigating the impact of increasing the threshold to \$15,000. This is based on a survey conducted in the commercial sector by Dr. Robert Williams and Dr. V. Sagar Bakhshi [Ref. 18]. Forty percent of the participants reported a competitive threshold averaging \$15,000. Enacting a threshold similar to one such as this would place the DOD procurement function on the same level with its commercial counterpart.

APPENDIX A

DETAILED COMPUTATION OF SAVINGS

Administrative ordering cost: $\$35 \times 1786 = \$62,510$
avg savings per purchase order) x (avg annual purchase orders)

Payroll:

Possible reduction in workforce: $\$30,597 \times 1.5 = \$45,895$
(GS - 5 avg annual salary) x (avg number of buyers reduced)

Reduction in buyer's workload: $\$30,597 \times .041 = \$1,275$
(GS - 5 avg annual salary) x (expediting related tasks)

Reduction in end user supervisor
supply related functions $\$44,033 \times .8 = \$35,227$
(GS - 12 avg supervisor salary) x (percentage of time)
eight supervisors experiencing a ten percent reduction of
time concerning supply functions

Reduction in end user division
supply focal point $\$30,597 \times .8 = \$24,478$
(GS - 5 avg annual salary) x (percentage of time)

Shortage Cost of technicians:
 $13.65 \times \$15.87 \times 8 \times 1786 = \$3,095,145$
(avg days delay) x (avg hourly wage rate) x (hours per day)
x (avg annual purchase orders)

APPENDIX B

LIST OF INTERVIEWEES

Baatz, Marion, Personnel Administrator, NAVPRO, Bethpage, personnel interview, May 1987.

Bednar, Richard, Government Contracts Curriculum, George Washington University, telephone interview, July 1987.

Blanton, Linda, Acquisition professional, Navy Field Management Team, NSC Charleston, telephone interview, August 1987.

Busch, Sid, Supervisor Electronics, Code 6255, NWC China Lake, telephone interview, August 1987.

Drake, C., CAPT, SC, USN, Supply Officer, NAS Point Mugu, personnel interview, June 1987.

Evans, Mark, LCDR, SC, USN, Naval Postgraduate School, Monterey, personal interview, September 1987.

Haden, Karen, Acquisition Professional, Code 25A, NWC China Lake, personal interview, June 1987.

Hennigan, Kay, Acquisition Professional, NAVSUP-02, telephone interview, May 1987.

Knotts, Scotty, Acquisition Professional, ALMC, Fort Lee, telephone interview, July 1987.

Lane, Jim, Acquisition Professional, Code 600, NAS Point Mugu, personal interview, June 1987.

Leroy, Steve, Comptroller, NAS Point Mugu, telephone interview, July 1987.

Linsder, Shirley, Procurement Director, Naval Postgraduate School, Monterey, personal interview, April 1987.

McWherter, M., CDR, SC, USN, Contracting Officer, NSC San Diego, telephone interview, June 1987.

Meriam, Jeff, Deputy Director of Contracts, Code 25A, NWC China Lake, personal interview, June 1987.

Moore, Thomas, Professor, Naval Postgraduate School, Monterey, personal interview, June 1987.

Morris, Bliss, Acquisition Professional, Procurement Support Detachment, Naval Hospital Alameda, telephone interview, June 1987.

Morris, John, Acquisition Professional, NAVSUP-02, telephone interview, May 1987.

Nyland, S., CDR, SC, USN, Contracting Officer, Code 25A, NWC China Lake, personal interview, June 1987.

O'Shields, Betty, Procurement Director, NSC Charleston Detachment, Kings Bay, telephone interview, February 1987.

Pezdek, Joe, Acquisition Professional, NAVPRO Bethpage, telephone interview, June 1987.

Phoenix, Ted, CDR, SC, USN, PMA 231D, Naval Air Systems Command, telephone interview, April 1987.

Scott, Shirley, Acquisition Professional, GSA, Office of Procurement Policy, telephone interview, May 1987.

Shackelford, J., LTC, Director of Contracting, Fort Ord, CA, personal interview, July 1987.

Sorges, Dennis, Supervisor, Code 3384, NWC China Lake, telephone interview, September 1987.

Stanton, Don, Electronics Supervisor, Code 6234, NWC China Lake, telephone interview, September 1987.

Thybony, William, COL, USA (Ret), telephone interview, July 1987.

Trent, Cassie, Small Purchase Supervisor, Code 600, NAS Point Mugu, personal interview, June 1987.

Verrado, John, Acquisition Professional, CBC Port Hueneme, telephone interview, July 1987.

Washington, Rebecca, Acquisition Professional, NSC Charleston Detachment, Kings Bay, telephone interview, August 1987.

Wells, Rita, Acquisition Professional, AFIT, Dayton, telephone interview, July 1987.

Weshler, Elaine, Acquisition Professional, NAVSUP-02, Washington, D.C., telephone interview, June 1987.

Williams, Wanda, Small Purchase Supervisor, Code 25A, NWC China Lake, personal interview, June 1987.

Williams, Robert, Acquisition Researcher, Fort Lee,
telephone interview, August 1987.

Windeler, Karen, Deputy Director of Contracts, Code 600, NAS
Point Mugu, personal interview, June 1987.

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6. CDR S. Nyland, SC, USN Contracting Division, Code 25A Supply Department Naval Weapons Center China Lake, California 93555	2
7. Dr. Paul M. Carrick, Code 54Ca Department of Administrative Sciences Naval Postgraduate School Monterey, California 93943-5000	1
8. LCDR R. Smith, Code 54Sx Department of Administrative Sciences Naval Postgraduate School Monterey, California 93943-5000	1
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